

IVC1 Series PLC Passive I/O Extension Module User Manual

Please allow us to congratulate you on choosing an INVT Auto-control Technology programmable logic controller (PLC). Before using the IVC1 series PLC product, please carefully read this book so as to fully understand its characteristics, use it safely and bring its functions into full play.

Note:

To reduce the chance of accident, please carefully read the operating instructions and safety precautions prior to use. Only adequately trained personnel shall install or operate this product. In operation, strict compliance with applicable safety rules in the industry, the operating instructions and safety precautions in this book is required.

1 Introduction

1.1 Appearance And Structure

The appearance and structure of I/O extension module are shown in the following figure.

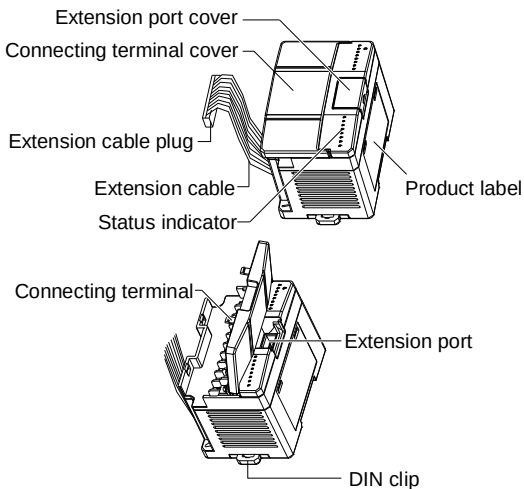


Figure 1-1 Appearance and structure

1.2 Model Designation

The model designation is shown in the following figure.

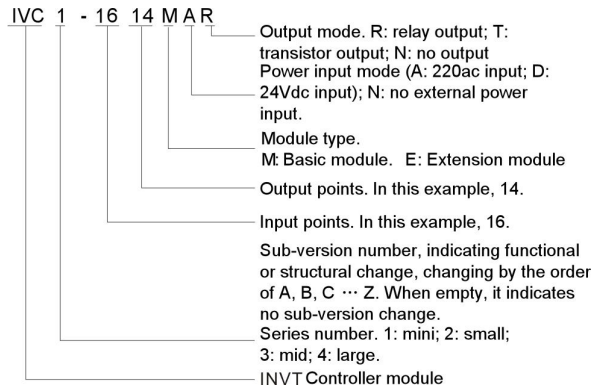


Figure 1-2 Model designation

1.3 Terminal Introduction

IVC1-0808ENR, IVC1-0808ENT

Pin	Function
S/S	Input mode selection: sink mode when connected with +24V, or source mode when connected with COM
•	Null, for isolation. Leave it suspended
X0 ~ X7	Digital input, work with COM to generate input signal
Y0 ~ Y7, COM0	Digital output

IVC1-0800ENN

Pin	Function
S/S	Input mode selection: sink mode when connected with +24V, or source mode when connected with COM
•	Null, for isolation. Leave it suspended
X0 ~ X7	Digital input, work with COM to generate input signal

IVC1-0008ENR, IVC1-0008ENT

Pin	Function
•	Null, for isolation. Leave it suspended
Y0 ~ Y7, COM0	Digital output

IVC1-0016ENR, IVC1-0016ENT

Pin	Function
•	Null, for isolation. Leave it suspended
Y0 ~ Y7, COM0	Control output terminal
Y10 ~ Y17, COM1	

IVC1-01600ENN

Pin	Function
S/S	Input mode selection: sink mode when connected with +24V, or source mode when connected with COM
•	Null, for isolation. Leave it suspended
X0 ~ X7, X10 ~ X17	Digital input, work with COM to generate input signal

2 Power Supply

Table 2-1 I/O extension module type and configuration

Type	Power supply voltage Vac	Number of I/O channels	Output type
IVC1-0800ENN	-	8/0	-
IVC1-0808ENR	-	8/8	Relay
IVC1-0808ENT	-	8/8	Transistor
IVC1-0008ENR	-	0/8	Relay
IVC1-0008ENT	-	0/8	Transistor
IVC1-1600ENN	-	16/0	/
IVC1-0016ENR	-	0/16	Relay
IVC1-0016ENT	-	0/16	Transistor

Table 2-2 I/O extension module insulation specifications

Name	Test condition
User output (relay) to extension bus	Capable of standing one minute of 2830Vac (50Hz) or RMS current with no breakdown or flashover. Leakage current $\leq 5\text{mA}$
User input to user output (relay)	Capable of standing one minute of 2830Vac (50Hz) or RMS current with no breakdown or flashover. Leakage current $\leq 5\text{mA}$
User input terminal and extension bus	Designed by following the SELV circuit requirements

Table 2-3 I/O extension module power requirement

Model	5Vdc/GND	24Vdc/GND	24Vdc/COM
IVC1-0800ENN	85mA	0	50mA
IVC1-0808ENR	70mA	50mA	50mA
IVC1-0808ENT	170mA	0	50mA
IVC1-0008ENR	70mA	50mA	0
IVC1-0008ENT	170mA	0	0
IVC1-1600ENN	85mA	0	50mA
IVC1-0016ENR	70mA	50mA	0
IVC1-0016ENT	170mA	0	0

Note:

- 5Vdc/GND: working power for logic circuit of extension module, provided by the extension bus
- 24Vdc/COM: input state detection power, through S/S terminal
- 24Vdc/GND: working power for relay circuit of extension module, provided by the extension bus

Before connecting the extension module to the basic module, calculate the total current of all extension module circuits. Make sure that the currents are smaller than the capacity of the corresponding power supply at the basic module to avoid overloading the basic module.

3 Input Features

3.1 IntENRal Equivalent Input Circuit

The extension module needs external power supply (+24Vdc) for detecting user switch status. The internal equivalent resistance of the input circuit is about $4.3\text{k}\Omega$, and bi-directional photo coupler is used for signal detection. You can use either sink mode or source mode, so long as dry contact digital signal is input. To connect to the output of active transistor sensor, you need to use the open collector output mode. The wiring of I/O extension module internal equivalent power and inputs is the same as those of the basic module, as shown in Figure 3-1.

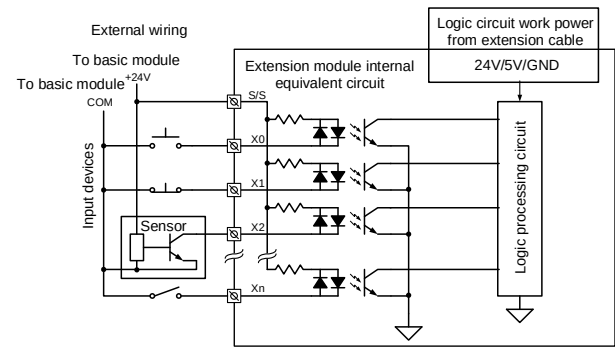


Figure 3-1 IntENRal equivalent input circuit

3.2 I/O Signal State Indicator

The input status indicator displays the status of input terminal. The indicator turns on when the input is in the ON state. Otherwise, the indicator is off.

The output status indicator displays the status of output terminal. The indicator turns on when the output is in the ON state (Yn is connected with COMn). Otherwise, the indicator is off. See Figure 3-2.

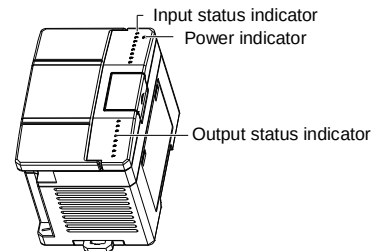


Figure 3-2 Status indicator

4 Output Features

4.1 Relay Output Electric Specifications

Table 4-1 Relay output terminal electric specifications

Item	Relay output terminal
ExtENRal power	Below 250Vac, 30Vdc
Circuit isolation	By relay
Operation indication	Relay output contacts closed, LED on
Leakage current of open circuit	-
Min. load	2mA/5Vdc
Max. output current	Resistive load
	Inductive load
	Illumination
Response time	OFF→ON
	ON→OFF

4.2 Transistor Output Electric Specifications

Table 4-2 Transistor output electric specifications

Item	Transistor output terminal
External power	5 ~ 24Vdc
Circuit isolation	Photo coupler

Item		Transistor output terminal
Operation indication		LED is on when photo coupler is driven
Leakage current of open circuit		< 0.1mA/30Vdc
Min. load		5mA (5 ~ 24Vdc)
Max. output current	Resistive load	3A/1 point 8A/4 points 1.6A/8 points Above 8 points, total current increases 0.1A at each point increase
	Inductive load	24Vdc, 7.2W
Response time	Illumination	24Vdc, 1.5W
	OFF→ON	Max. 0.5ms (100mA/24Vdc)
	ON→OFF	Max. 0.5ms (100mA/24Vdc)

4.3 Output Connection Example

Connecting an IVC1-0808ENR to an IVC1-1614MAR is shown in Figure 4-1. Different output groups can be connected to different signal voltage circuits. For example, output group Y0-COM0 can be connected to the 24Vdc circuit, powered by the local 24V/COM; Y1-COM1, to the 5Vdc circuit; others, like Y2 ~ Y7, to the 220Vac circuit. That is, different output groups can work at circuits of different voltages.

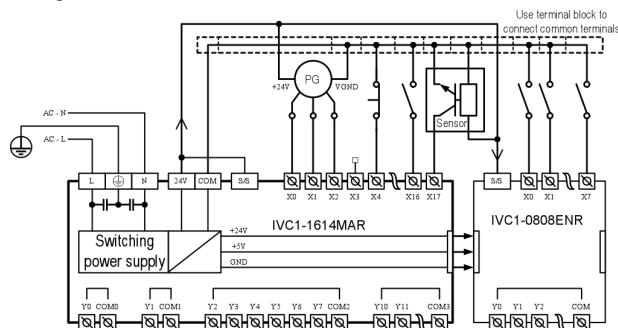


Figure 4-1 Connecting IVC1-1614MAR & IVC1-0808ENR

5 Extension Connection

5.1 Extension Bus Connection

Before power-on, remove the cover of the extension port at the right of the basic module. Insert the bus plug into the extension port. If there are more than one extension modules, connect them one by one. Note that the extension port cover is detachable. Do not have it lost.

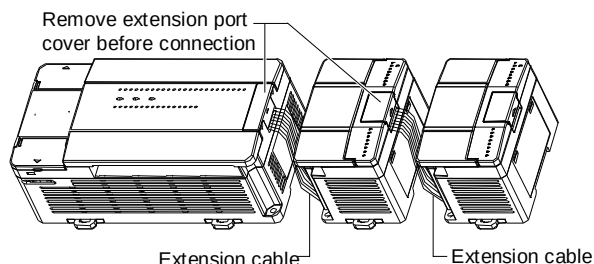


Figure 5-1 Cascade connection of extension module

5.2 Extension Module Addressing

IVC1 series PLC can identify the connected extension module and address them by connection order automatically. The extension module address is set upon the first power on and remains unchanged. Therefore do not insert or remove the extension module during operation, otherwise abnormalities may occur, or PLC may be damaged. The addresses of I/O channels are in the octal system, numbered as 0, 1, . . . , 7, 10, 11 and so on, without numbers 8 and 9.

The input terminals of all modules (basic and extension) are numbered as X0, X1, X2, . . . X7, X10, X11 and so on, while the output terminals are numbered as Y0, Y1, Y2, . . . Y7, Y10, Y11 and so on. Every eight channels form one group. If the remaining channels are less than 8, the unused numbers will be left unassigned.

For example, in module IVC1-1410MAR, its 14 input channels are numbered as X0 ~ X15, there will be no channels numbered as X16 or X17, because the input channels of the next extension module will start from X20. Likewise, if the module has 10 output channels that are numbered as Y0 ~ Y11, there will be no channels numbered as Y12 ~ Y17, because the output channels of the next extension module will start from Y20.

The extension modules' I/O channels are numbered in accordance with the module's connection order. See the following for a numbering example.

IVC1-1410MAR	IVC1-0808ENT	IVC1-0008ENR	IVC1-0800ENN	IVC1-0008ENT
X0~X15 Y0~Y11	X20~X27 Y20~Y27	Y30~Y37	X30~X47	Y40~Y47

6 Installation

6.1 Sizes

There are eight I/O extension module models: IVC1-0800ENN, IVC1-0808ENR, IVC1-0808ENT, IVC1-0008ENR, IVC1-0008ENT, IVC1-1600ENN, IVC1-0016ENR and IVC1-0016ENT. Their sizes and installation holes are shown in Figure 6-1.

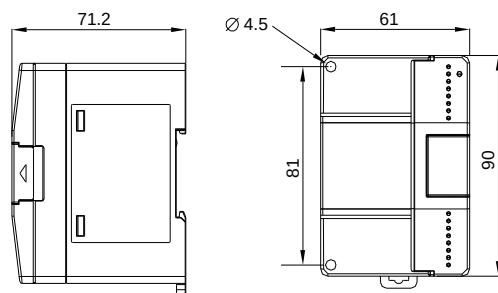


Figure 6-1 I/O extension module sizes and installation holes

6.2 Installation Method

The installation method of extension module is the same as that of the basic module. See IVC PLC User Manual for details. See Figure 6-2 for the installation diagram.

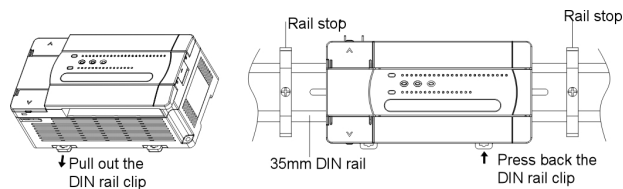


Figure 6-2 DIN rail mounting

Notice

1. The warranty range is confined to the PLC only.
2. **Warranty period is 18 months**, within which period INVT Auto-control Technology Co. Ltd. conducts free maintenance and repairing to the PLC that has any fault or damage under the normal operation conditions.
3. **The start time of warranty period is the delivery date of the product**, of which the product SN is the sole basis of judgment. PLC without a product SN shall be regarded as out of warranty.
4. Even within 18 months, maintenance will also be charged in the following situations:
 - Damages incurred to the PLC due to mis-operations, which are not in compliance with the User Manual;
 - Damages incurred to the PLC due to fire, flood, abnormal voltage, etc;
 - Damages incurred to the PLC due to the improper use of PLC functions.
5. The service fee will be charged according to the actual costs. If there is any contract, the contract prevails.
6. Please keep this paper and show this paper to the maintenance unit when the product needs to be repaired.
7. If you have any question, please contact the distributor or our company directly.

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